

Lightning Safety

Much of our nation experiences showers and storms during the warmer months, many of which have thunder and lightning associated. Thunderstorms and thundershowers, bring several hazards with them, specifically hail and lightning, in addition to potentially heavy rainfall. Lightning is the greater of the two hazards, and appropriate attention is not always given to preventing injury and property damage from lightning.

Lightning develops as a result of the difference in electrical potential between the clouds in a storm, and the ground surface. The electrical charge in the clouds is negatively charged; the ground and objects below the cloud formations are positively charged. The positive charge, attracted to the negative charge, accumulates at the highest points. Lightning then occurs as the difference between negative and positive charges is great enough to overcome the natural resistance of the air, and the current created flows from negative to positive, whether within the clouds, sideways between clouds, or from clouds to the ground.

Lightning strikes are a cause of enormous property damage in the United States, to the tune of approximately \$5 billion per year. Lightning strikes in the western states frequently cause wildfires that consume hundreds of thousands of acres of forest and rangeland annually. Lightning may also directly strike humans and animals if they are, or are near the highest accumulation positive charge. While not always fatal, when people are struck by lightning many will suffer severe injuries and potential disability for years.

You can protect yourselves, and your property, by reducing the risk of lightning strikes. We will cover several areas, and ways you can better guard against injury, or loss of property.

Outdoor Safety

Most of the storms that bring lightning occur during the summer months when we are most active outdoors. We also are more often engaged in activities which would place us at higher risk for a lightning strike. The activities for example are; swimming, boating, camping, fishing and golf. All of them in the event of a thunderstorm may place us in circumstances where we may be the highest point of positive charge accumulation, or in the immediate vicinity.

To protect yourself, you need to be aware of and practice the following:

- Be aware of the weather forecast and plan outings accordingly
- If you are in or on the water during a thunderstorm, by default you may become the highest point for positive electrical potential, and are also in a good electrical conductor.
- Boats' masts or antennas can serve as high points. Fiberglass boats with masts, such as sailboats are at greater risk. Lightning protective mast systems are available, or can be fabricated. In a small aluminum or fiberglass boat such as a jon-boat or canoe, the human occupants may be the highest point. Fishing rods,

- particularly graphite ones are good electrical conductors. If possible, get to shore and seek substantial shelter.
- Golfing is not normally thought of as a dangerous sport, but in a thunderstorm it can become so quickly. If out on a course, and a storm develops, seek substantial shelter. Do not continue play, as golf clubs are excellent electrical conductors. Swinging through with a club suddenly may make you the highest point around.
 - Do not go under trees for shelter in a thunderstorm, especially ones which are isolated.

You can estimate the distance between you and the storm by the time interval between a flash of lightning and the sound of thunder you hear. It takes about five seconds for the sound to travel each mile; if the time is 30 seconds or less, seek shelter if you are outdoors. While you are in shelter, avoid contact with any source of conduction of electricity, such as appliances, outlets, and the telephone. If you are in a car, stay in the vehicle and lean away from the doors, and avoid touching items like the shift lever, or ignition.

If you are caught outdoors and cannot get to shelter in time, you may get a warning signal that you may be struck. Sometimes one's hair may stand on end, a tingling sensation may be felt on your skin, light metal objects may vibrate, or you may hear crackling. If any of these happen, you must lower your potential by assuming the lightning crouch; put your feet together, squat down and tuck your head down while covering your ears. As soon as these signs are not present, seek shelter immediately.

Building and Structural Safety

Among his many contributions to the Nation, in addition to helping frame the Declaration of Independence, and the Constitution, Benjamin Franklin developed what is commonly referred to as the lightning rod. Also referred to as Franklin rod systems these serve to dissipate lightning strikes on buildings, and reduce physical damage from the electricity, and possibly a resulting fire.

The National Fire Protection Association (NFPA) has a standard issued for lightning protection systems for buildings, NFPA 780. Details on this standard are available from NFPA (www.nfpa.org) for a fee; and they include which buildings are covered as well as the design, fabrication, and installation of the systems

If you seek more in depth information, please refer to the National Lightning Safety Institute website, from which most of the information contained in this document was gleaned: www.lightningsafety.com. As with many fields of science, the study of lightning, and the state of the art in lightning protection is ever changing.